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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Customer No.:	23643	
Group:	1764	
Confirmation No.:	5525	
Application No.:	10/634,056	
Invention:	APPARATUS AND METHOD FOR CONTROLLING THE OXYGEN-TO-CARBON RATIO OF A FUEL REFORMER	**DATED: FEBRUARY 26, 2007**
Applicant:	Rudolf M. Smaling	
Filed:	August 4, 2003	
Attorney Docket:	9501-73118	
Examiner:	Vinit H. Patel	

APPEAL BRIEF

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is submitted electronically in support of the appeal from the Primary Examiner's July 5, 2006 final rejection of claims 1-18. Because the 3-month extension period from the filing of the Notice of Appeal on September 25, 2006 expired on Sunday, February

25, 2007, this Brief is being timely filed on Monday, February 26, 2007. As such, Appellants hereby petition the Commissioner for Patents to extend the time to file this Appeal Brief for three months from November 25, 2006 to February 26, 2007. Appellants hereby authorize the Commissioner to charge the cost of the three-month extension to Deposit Account No. 10-0435. Please charge any additional fees or credit any overpayments to Deposit Account No. 10-0435, with reference to our file number 9501-73118.

REAL PARTY IN INTEREST

The real party in interest is Arvin Technologies, Incorporated, the assignee, pursuant to assignments recorded in the records of the U. S. Patent and Trademark Office at reel 014374, frame 0128.

RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellants that will directly affect or be directly affected by, or have a bearing on the Board's decision in the present appeal.

STATUS OF CLAIMS

Claims 1-18 were finally rejected in the Office Action dated July 6, 2006.

Each of claims 1-18 is appealed.

A copy of pending claims 1-18 is attached hereto in an Appendix.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent Claim 1:

Claim 1 is directed to a method (*e.g.*, control routine 100) of operating a fuel reformer (14) that includes determining the temperature of a reformate gas produced by the fuel reformer (14) (see, *e.g.*, step 102 of control routine 100 as described in FIG. 3). The method further includes adjusting the air-to-fuel ratio of an air/fuel mixture processed by the fuel reformer (14) based on the temperature of the reformate gas (see, *e.g.*, steps 106 and 108 of control routine 100 as described in

FIG. 3). See FIG. 3 along with the corresponding description on page 13, line 5 through page 15, line 2.

Independent Claim 8:

Claim 8 is directed towards a fuel reforming assembly (10) having a fuel reformer (14), a temperature sensor (34), and a controller (16). The controller (16) is electrically coupled to both the fuel reformer (14) and the temperature sensor (14). The controller (16) has a processor (28) and a memory device (30) having stored therein a plurality of instructions. When the instructions are executed by the processor (28), the processor (28): (i) monitors output from the temperature sensor (34) so as to determine the temperature of a reformate gas produced by the fuel reformer (14); and (ii) adjusts an air-to-fuel ratio of an air/fuel mixture processed by the fuel reformer (14) based on the temperature of the reformate gas. See FIGS. 1 and 2 along with the corresponding description on page 3, line 15 through page 10, line 21.

Independent Claim 16:

Claim 16 is directed towards a method (*e.g.*, control routine 100) of operating a fuel reformer (14) that includes operating the fuel reformer (14) so as to process an air/fuel mixture having a first air-to-fuel ratio during a first period of time. The method further includes determining the temperature of a reformate gas produced by the fuel reformer during the first period of time (see, *e.g.*, step 104 of control routine 100 as described in FIG. 3). The method further includes operating the fuel reformer so as to process an air/fuel mixture having a second air-to-fuel ratio during a second period of time based on the temperature of the reformate gas, the air/fuel mixture having the second air-to-fuel ratio being different than the air/fuel mixture having the first air-to-fuel ratio (see, *e.g.*, steps 106 and 108 of control routine 100 as described in FIG. 3). See FIG. 3 along with the corresponding description on page 13, line 5 through page 15, line 2.

SOLE GROUND OF REJECTION TO BE REVIEWED ON APPEAL

The following sole ground of rejection is presented for review:

(1) the rejection of claims 1-18 under 35 U.S.C. §102(e) as being as being anticipated by U.S. Patent Application No. 2002/0108306 to Grieve et al. (hereinafter "Grieve").

ARGUMENT

I. THE BOARD IS URGED TO REVERSE THE SOLE GROUND OF REJECTION

The claims within the sole ground of rejection will be separately argued in the following groups:

Group A – claims 1, 2, 5-7, 9, and 16-18

Group B – claims 3 and 4

Group C – claims 8 and 12-14

Group D – claims 10 and 11

Group E – claim 15

A. Claims 1, 2, 5-7, 9, and 16-18 are not Anticipated by Grieve

Anticipation exists only if all the elements of the claimed invention are present in a product or process disclosed, expressly or inherently, in a single prior art reference. *See Hazeltine Corp. v. RCA Corp.*, 468 U.S. 1228 (1984). As will be discussed in detail below, Appellants assert that the §102 rejections of claims 1, 2, 5-7, 9, and 16-18 are improper and should be overruled for at least the following reasons:

(i) there is no teaching in Grieve of adjusting the air-to-fuel ratio of the air/fuel mixture being processed by the reformer, and

(ii) for arguments sake, even if it did, there is no teaching in Grieve of adjusting the air-to-fuel ratio based on the temperature of the reformate gas being produced by the reformer.

<u>(i) Grieve does not teach adjusting the air-to-fuel ratio of the air/fuel mixture</u>

The fuel reformer 22 of Grieve includes a first flow of air 48 and second flow of air 50 that are introduced to an inlet 70 of the fuel reformer 22 to form a mixed stream 80. Fuel 30 is also supplied to the inlet 70 of the reformer 22. The air flows 48, 50 are controlled, respectively, by air control valves 45, 46. The first air flow 48 is preheated to supply hot air at the inlet 70 of the fuel reformer, while the second air flow 50 is kept at or slightly above ambient temperature. By use of heated air from the first air flow 48, the temperature of the inlet 70 can be increased so that the fuel 30 is vaporized prior to being supplied to the reformer 22 during otherwise cool operating conditions.

The system of Grieve also includes a pair of temperature sensors – a temperature sensor 72 "disposed" at the inlet 70 of the fuel reformer 22 and a temperature sensor 74 "disposed" at the outlet 76 of the fuel reformer 22. Both sensors are described in Grieve as being in "operative communication" with the control valves 45, 46. *The temperature sensor 72 is used to sense the temperature the mixed air stream 80.* Namely, if the temperature of the mixed air stream 80 is below a predetermined threshold, a controller sends a signal to control valve 45 to allow heated air from the first air flow 48 to flow to the inlet for heating the mixed air stream. If the temperature of the mixed air stream 80 is too high, the controller signals for the valve 46 to open and allow the cooler second air flow 50 to flow to the inlet 70. (See, e.g., Grieve [0020] and [0025]-[0027].)

As described above, the system of Grieve adjusts ***the temperature*** of the air being supplied to the fuel reformer based on the sensed temperature of the stream of air entering the reformer. There is no teaching whatsoever of adjusting ***the quantity*** of air entering the fuel reformer, only the temperature of air entering the reformer. In other words, there is no teaching in Grieve of adjusting the air-to-fuel ratio of the air/fuel mixture being processed by the reformer.

On page 2 of the 7/5/06 office action, the Examiner alleges that Grieve discloses adjusting an air-to-fuel ratio of an air/fuel mixture in paragraph [0008], which is as follows:

> [0008] A method of controlling temperature at a fuel reformer comprises sensing the temperature at the fuel reformer and adding air to the fuel reformer.

In the Response to Arguments section of the 7/5/06 Office Action, the Examiner supports his flawed interpretation by stating Grieve "teaches a reformer which in normal operation, senses a temperature condition at a fuel reformer and adds air to a fuel reformer, anticipating Applicant's method of

sensing a reformate temperature condition [sic, the term "condition" does not appear in the claim limitation] and adjusting the air/fuel ratio of a feed stream into a reformer." This passage epitomizes the Examiner's flawed interpretation of Grieve to Appellant's claims. ***Namely, the mere fact that the cited passage of Grieve teaches "adding air" does not in any way expressly teach changing the air-to-fuel ratio of the air/fuel mixture being processed by the reformer. This is especially true when the cited passage is not contemplated in a vacuum, but rather read in light of the entire disclosure.*** To wit, as pointed out to the Examiner in a previous office action response, consider paragraph [0030] of Grieve where it is disclosed that:

> Another advantage of dual air actuator system 100 is that first air 48 and second air 50 help to maintain a stable, regular, **uniform air/fuel ratio** to provide efficiency in fuel reformer 22 and also to prevent coking and deposition of soot in fuel reformer 22.

This passage of the disclosure clearly contradicts the Examiner's assertion that Grieve teaches adjusting the air-to-fuel ratio of the air/fuel mixture processed by the fuel reformer. In response, in the Remarks to Arguments section of the 7/5/06 Office Action, the Examiner responded by saying that this passage of Grieve reflected an "advantage", but that in "normal operation" the system of Grieve operates to adjust the air-to-fuel ratio of the air/fuel mixture. The Examiner cited paragraph [0029] of Grieve to support this interpretation. However, a careful reading this paragraph merely recites that a quantity of heated or ambient air can be used based on the temperature at the inlet of the reformer, but is completely silent as to a change in air-to-fuel ratio of the air/fuel mixture.

In other words, contrary to the Examiner's assertion and citations, nothing in Grieve expressly supports the notion that Grieve's system adjusts the air-to-fuel ratio of the air/fuel mixture being processed by the reformer. ***In fact, an electronic search of the text of Grieve reveals that the word "ratio" only appears in the passage from paragraph [0030] cited by Appellants above where it is indicated that the system maintains a "uniform air/fuel ratio".***

During an interview with the Examiner conducted on July 19, 2006 (a Summary of which is being filed herewith), the Examiner was confronted with the Appellant's position that paragraph [0008] of Grieve did not expressly disclose adjusting an air-to-fuel ratio. In response, the Examiner stated that the Office's practice of applying "the broadest reasonable interpretation" allowed him to interpret paragraph [0008] of Grieve to read on Appellant's claims. While it is true the broadest reasonable interpretation standard does afford the Examiner a certain degree of latitude

in formulating his rejection, the Examiner has clearly misapplied the standard in this case. Namely, as noted in MPEP 2111, the "broadest reasonable interpretation" standard is used for interpreting ***the claims*** being examined for comparison to the relevant prior art. The Examiner appears to have applied the broadest reasonable interpretation standard in a backwards fashion. Specifically, the Examiner is attempting to give a passage of a relied-upon reference "the broadest reasonable interpretation" and then analyzing the claims in light of this interpretation. Instead, the proper course is to give the claim language examined its broadest reasonable interpretation as it would be understood by one of ordinary skill in the art. This interpretation is then compared to the prior art.

Based on the above, the Examiner appears to have improperly used the broadest reasonable interpretation standard to expand the language of paragraph [0008] of Grieve because the paragraph, on its face, is lacking the teaching the Examiner believes exists. The Examiner's misapplication of the broadest reasonable interpretation standard appears to be more like an attempt at arguing inherency. However, the record is completely devoid of the required factual analysis to support a rejection based upon inherency. Indeed, to establish anticipation through inherency, the rule is well established:

> To serve as an anticipation when the reference is silent about the asserted inherent characteristic, such gap in the reference **may be filled with recourse to extrinsic evidence.** Such evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.

Continental Can Co. USA v. Monsanto Co., 948 F.2d 1264, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991.). Thus, it is abundantly clear that the Examiner is required to set forth some sort of factual inquiry to establish inherency. In this instance, the Examiner has failed to provide any factual inquiry as to why the Examiner believes that paragraph [0008], or any other passage of Grieve, inherently discloses the claimed limitations.

In summary, based on the above discussion, the Examiner has failed to establish a proper rejection based on Grieve since he has not shown how Grieve expressly or inherently teaches adjusting the air-to-fuel ratio of the air/fuel mixture being processed by the reformer.

(ii) Grieve does not teach adjusting the air-to-fuel ratio based on the temperature of the reformate gas

Even if one assumes, for arguments sake, that Grieve teaches adjusting the air-to-fuel ratio of the air/fuel mixture being processed (a notion strongly rejected by the Appellant), the Examiner still has not put forth a proper rejection based on Grieve since such an adjustment of the air-to-fuel ratio is not based on the temperature of the reformate gas.

It is unclear from the prosecution record whether the Examiner relies on Grieve's inlet sensor (sensor 72) or outlet sensor (sensor 74) for the purported temperature sensing function. However, such a distinction is irrelevant since the discussion relating neither sensor can be relied upon for the purpose of the stated function. Indeed, as described in paragraph [0023], the inlet sensor 72 senses the temperature ***of the mixed air stream 80*** at the inlet of the reformer. In other words, the inlet sensor 72 does not in any way sense the temperature of the reformate gas being produced by the reformer (which makes sense since it is located at the inlet of the reformer). All of the passages cited extensively by the Examiner, i.e, paragraphs [0023]-[0028], discuss operation of the air control valves 45, 46 based on output from the inlet temperature sensor 72. None of such discussion can support the notion of operating the air control valves based on a sensed reformate gas temperature since the inlet sensor 72 does not in any way sense the temperature of the reformate gas, but only the mixed air stream 80.

However, for parts of his argument, the Examiner conveniently identifies the outlet sensor 74 as the teaching of a sensor for sensing the temperature of the reformate gas produced by Grieve's fuel reformer. However, the entirety of the discussion of the outlet sensor's function is contained in the last two lines of paragraph [0023]:

> A temperature sensor 74 may also be disposed at an outlet 76 of fuel reformer 22. Temperature sensor 74 is also preferably in operative communication with air control valves 45, 46.

There is no further discussion whatsoever of the role of the outlet sensor 74. In other words, Grieve is completely devoid of any express teaching of how the valves are operated based on output from the outlet temperature sensor 74. The Examiner has apparently relied on the location of the outlet temperature sensor 74 to find a teaching of sensing the temperature of the reformate gas, but then relies on passages of Grieve related to operation of the air valves based on output from the inlet temperature sensor 72. This is insufficient and improper. At the end of the day, there is no teaching

whatsoever in Grieve related to the operation of the air valves based on output from the outlet temperature sensor 74 – the reference merely says the sensor 74 is in operative communication, but does not disclose what this means.

Not only does Grieve not expressly teach any operation of the air valves based on output from the outlet temperature sensor 74, the record is completely devoid of the required factual analysis to support that the purported functions are inherent to Grieve. As discussed above, to establish anticipation through inherency, a factual inquiry is required such as described in *Continental Can Co. USA,* 948 F.2d at 1268. In this instance, the Examiner has failed to provide any factual inquiry as to why the Examiner believes that Grieve inherently discloses operation of the air valves based on output from the outlet temperature sensor 74 in the manner he purports.

In summary, based on the above discussion, the Examiner has failed to establish a proper rejection based on Grieve since he has not shown how Grieve expressly or inherently teaches adjusting the air-to-fuel ratio based on the temperature of the reformate gas.

(iii) Summary Regarding Claims 1, 2, 5-7, 9, and 16-18

In summary, Grieve fails to disclose adjusting an air-to-fuel ratio of an air/fuel mixture based upon the temperature of a reformate gas. As such, the Examiner's rejection of claims 1, 2 5-7, 9, and 16-18 are improper and should be withdrawn.

B. Claims 3 and 4 are not Anticipated by Grieve

The §102 rejections of claims 3 and 4 are improper and should be reversed since, as argued above, Appellants believe that Grieve does not disclose adjusting an air-to-fuel ratio based upon the temperature of a reformate gas. However, even if for arguments sake Grieve does disclose this, as the Examiner has alleged, Grieve does not disclose **reducing** the air-to-fuel ratio based upon the temperature of a reformate gas by the Examiner's own admission. Specifically, the Examiner stated in the final office action that "Grieve teaches that the reformer may be regulated by **adding air** to the reformer [0029]." (See page 7.)(Emphasis Added.) Thus, the Examiner believes that the air-to-fuel ratio is adjusted in Grieve by the addition of air, which increases the air-to-fuel ratio, not by **reducing** the air-to-fuel ratio. As such, the Examiner has actually pointed out that Grieve does not anticipate claims 3 and 4.

C. Claims 8 and 12-14 are not Anticipated by Grieve

The §102 rejections of claims 8 and 12-14 are improper and should be reversed for at least the following reasons:

(i) there is no teaching in Grieve of adjusting an air-to-fuel ratio of an air/fuel mixture processed by the fuel reformer based on the temperature of the reformate gas; and

(ii) it is not inherently taught in Grieve to adjust an air-to-fuel ratio based on the temperature of the reformate gas.

(i) There is no adjustment of an air-to-fuel ratio of an air/fuel mixture processed by the fuel reformer based on the temperature of the reformate gas

The arguments put forth above in section I.A. relating to Grieve failing to disclose adjusting an air-to-fuel ratio of an air/fuel mixture processed by the fuel reformer based on the temperature of the reformate gas are relevant to the rejections of claims 8 and 12-14 and are incorporated in their entirety into Appellants' arguments relating to claims 8 and 12-14. Of particular note, the Examiner relies on Grieve's outlet sensor 74 to read on the claimed sensor of claim 8. As pointed out above, Grieve is completely devoid of any discussion related to the use of the output from its outlet sensor 74.

(ii) It is not inherently taught in Grieve to adjust an air-to-fuel ratio based on the temperature of the reformate gas

The Examiner acknowledges that Grieve does not disclose a controller that adjusts an air-to-fuel ratio based upon the temperature of a reformate gas. (See pages 3 and 4.) However, the Examiner whisks this shortcoming under the rug by stating that Grieve's system would inherently have to function in such a manner "in order for the apparatus to function as intended". He cites *In re Napier*, 55 F. 3d 610, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995) as support for such a broad-reaching notion. In regard to inherency, *In re Napier* appears to merely stand for the notion that "[t]he inherent teaching of a prior art reference, a question of fact, arises both in the context of anticipation and obviousness." *Id.* at 613. Appellant certainly believes that inherency is a question of fact. The unsupported, conclusory statement offered by the Examiner (i.e., "in order for the apparatus to function as intended") cannot function as legally sufficient substitute for the required factual

analysis. At the end of the day, the Examiner has not engaged in the factual inquiry required to set forth a proper inherency argument as required by *Continental Can Co.* or any of the numerous other cases which embody this area of the law.

As such, the Examiner's rejections of claims 8 and 12-14 are improper and should be reversed.

D. Claims 10 and 11 are not Anticipated by Grieve

Claims 10 and 11 are dependent upon claim 8. As a result, the arguments put forth above in section I.C. are relevant to the rejections of claims 10 and 11 and are incorporated in their entirety into Appellants' argument relating to claims 10 and 11. Moreover, as previously stated, Grieve does not disclose adjusting an air-to-fuel ratio based upon the temperature of a reformate gas. However, even if for arguments sake, Grieve could be interpreted to disclose this, Grieve does not disclose **reducing** the air-to-fuel ratio based upon the temperature of a reformate gas by the Examiner's own admission. Specifically, the Examiner stated in the final office action that "Grieve teaches that the reformer may be regulated by **adding air** to the reformer [0029]." (See page 7.)(Emphasis Added.) Thus, the Examiner believes that the air-to-fuel ratio is adjusted by the addition of air, which increases the air-to-fuel ratio, not by **reducing** the air-to-fuel ratio. As such, the Examiner has actually pointed out that Grieve does not anticipate claims 10 and 11.

E. Claim 15 is not Anticipated by Grieve

In formulating his rejection relating to claims 14 and 15, the Examiner flip flops between which structure of Grieve reads on the claimed sensor. In regard to claim 14, the Examiner indicates that the inlet sensor 72 is located within a reactor housing, but then indicates for purposes of rejecting claim 15 that the outlet sensor 74 is positioned outside such a reactor housing. The mere fact that the Examiner changes which sensor he is considering does not change the result – both sensors 72, 74 are located in the same place. In other words, as shown in FIG. 2 of Grieve, both the temperature sensors 72, 74 are disposed ***within*** the fuel reformer 22. As such, the Examiner has not established a proper §102 rejection with regard to Appellants' claim 15, and the rejection thereof should be reversed.

II. SUMMARY CONCLUSION

Therefore, in view of the arguments presented above, it is submitted that the Examiner's sole ground of rejection is erroneous. The Board is thus urged to reverse these rejections. Such action is respectfully requested.

Respectfully submitted,

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<u>CLAIMS APPENDIX</u>

1. A method of operating a fuel reformer, comprising the steps of:

determining the temperature of a reformate gas produced by the fuel reformer, and

adjusting an air-to-fuel ratio of an air/fuel mixture processed by the fuel reformer based on the temperature of the reformate gas.

2. The method of claim 1, wherein:

the fuel reformer has an air inlet valve associated therewith, and

the adjusting step comprises adjusting position of the air inlet valve based on the temperature of the reformate gas.

3. The method of claim 1, wherein:

the determining step comprises comparing the temperature of the reformate gas to a predetermined temperature value, and

the adjusting step comprises reducing the air-to-fuel ratio of the air/fuel mixture if the temperature of the reformate gas is greater than the predetermined temperature value.

4. The method of claim 3, wherein:

the fuel reformer has an air inlet valve associated therewith, and

reducing the air-to-fuel ratio of the air/fuel mixture comprises adjusting position of the air inlet valve so as to reduce a flow of air advancing therethrough.

5. The method of claim 1, wherein:

the determining step comprises comparing the temperature of the reformate gas to a predetermined temperature value, and

the adjusting step comprises increasing the air-to-fuel ratio of the air/fuel mixture if the temperature of the reformate gas is less than the predetermined temperature value.

6. The method of claim 5, wherein:

the fuel reformer has an air inlet valve associated therewith, and

increasing the air-to-fuel ratio of the air/fuel mixture comprises adjusting position of the air inlet valve so as to increase a flow of air advancing therethrough.

7. The method of claim 1, wherein the determining step comprises sensing the temperature of the reformate gas with a temperature sensor.

8. A fuel reforming assembly, comprising:

a fuel reformer,

a temperature sensor, and

a controller electrically coupled to both the fuel reformer and the temperature sensor, wherein the controller comprises (i) a processor, and (ii) a memory device electrically coupled to the processor, the memory device having stored therein a plurality of instructions which, when executed by the processor, causes the processor to:

(a) monitor output from the temperature sensor so as to determine the temperature of a reformate gas produced by the fuel reformer, and

(b) adjust an air-to-fuel ratio of an air/fuel mixture processed by the fuel reformer based on the temperature of the reformate gas.

9. The fuel reforming assembly of claim 8, further comprising an electrically-controlled air inlet valve, wherein:

the air inlet valve is electrically coupled to the processor, and

the plurality of instructions, when executed by the processor, further cause the processor to adjust position of the air inlet valve based on the temperature of the reformate gas.

10. The fuel reforming assembly of claim 8, wherein the plurality of instructions, when executed by the processor, further cause the processor to:

(a) compare the temperature of the reformate gas to a predetermined temperature value, and

(b) reduce the air-to-fuel ratio of the air/fuel mixture if the temperature of the reformate gas is greater than the predetermined temperature value.

11. The fuel reforming assembly of claim 8, further comprising an electrically-controlled air inlet valve, wherein:

the air inlet valve is electrically coupled to the processor, and

the plurality of instructions, when executed by the processor, further cause the processor to:

(a) compare the temperature of the reformate gas to a predetermined temperature value, and

(b) adjust position of the air inlet valve so as to reduce a flow of air advancing therethrough if the temperature of the reformate gas is greater than the predetermined temperature value.

12. The fuel reforming assembly of claim 8, wherein the plurality of instructions, when executed by the processor, further cause the processor to:

(a) compare the temperature of the reformate gas to a predetermined temperature value, and

(b) increase the air-to-fuel ratio of the air/fuel mixture if the temperature of the reformate gas is less than the predetermined temperature value.

13. The fuel reforming assembly of claim 8, further comprising an electrically-controlled air inlet valve, wherein:

the air inlet valve is electrically coupled to the processor, and

the plurality of instructions, when executed by the processor, further cause the processor to:

(a) compare the temperature of the reformate gas to a predetermined temperature value, and

(b) adjust position of the air inlet valve so as to increase a flow of air advancing therethrough if the temperature of the reformate gas is less than the predetermined temperature value.

14. The fuel reforming assembly of claim 8, wherein:

the fuel reformer comprises a reactor housing, and

the temperature sensor is positioned in the reactor housing.

15. The fuel reforming assembly of claim 8, wherein:

the fuel reformer comprises a reactor housing, and

the temperature sensor is positioned outside the reactor housing.

16. A method of operating a fuel reformer, the method comprising the steps of:

operating the fuel reformer so as to process an air/fuel mixture having a first air-to-fuel ratio during a first period of time,

determining the temperature of a reformate gas produced by the fuel reformer during the first period of time, and

operating the fuel reformer so as to process an air/fuel mixture having a second air-to-fuel ratio during a second period of time based on the temperature of the reformate gas, the air/fuel mixture having the second air-to-fuel ratio being different than the air/fuel mixture having the first air-to-fuel ratio.

17. The method of claim 16, wherein:

the fuel reformer has an air inlet valve associated therewith,

the step of operating the fuel reformer so as to process the first air/fuel mixture having a first air-to-fuel ratio comprises positioning the air inlet valve at a first valve position, and

the step of operating the fuel reformer so as to process the second air/fuel mixture having the second air-to-fuel ratio comprises positioning the air inlet valve at a second valve position, the second valve position being different that the first valve position.

18. The method of claim 16, wherein the determining step comprises sensing the temperature of the reformate gas with a temperature sensor.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None